Forest Insect Laboratory
445 U. S. Court House
Portland 5, Oregon
August 28, 1946.

FOREST INSECT SITUATION IN

CRATER LAKE NATIONAL PARK, AUGUST 1946

After a lapse of twelve years the mountain pine beetle in the pine stands of Crater Lake National Park again shows epidemic tendencies. Groups of vigorously attacked trees have developed in lodgepole pine in Pinnacles Valley in the southeastern part of the park. No serious losses have yet occurred; however, there is a very real threat to the remaining mature pines that were so laboriously saved by control in the years 1925 to 1934. At this stage there is an unusually good opportunity to forestall an impending outbreak at no great cost.

The situation in Pinnacles Valley was brought to light on August 11 and 12 during an examination by Chief Forester J. D. Coffman, Regional Forester Burnett Sanford, and Chief Ranger C. J. Crouch of the National Park Service and R. L. Furniss of the Bureau of Entomology and Plant Quarantine. Observations were made from the rim road, the roads to the north, southeast, and south entrances, and from high points, notably The Watchman and Mount Scott. A fairly good general view of all major protection areas, except the extreme southwestern portion of the park, was obtained. Some sampling was done to locate newly infested trees in Pinnacles Valley.

Review

The record of insect infestation in the park is pertinent to current developments and especially to considerations of control. In 1924, when detailed entomological observations were first made, it appeared that an outbreak of the mountain pine beetle had been in progress some ten to fifteen years in the northern part of the park. By 1924 large areas of lodgepole pine in the park and on the adjoining national forest land had been killed and this infestation appeared beyond control. In the following ten years the beetles completed the destruction of susceptible lodgepole in the northern part of the park and spread to the southern part where a strong effort was made to suppress the outbreak by direct control. These measures, supplemented by the effects of low winter temperatures in December of 1932, finally brought the epidemic to an end. A considerable amount of mature pine was saved. These are the trees that are now threatened.

Direct control was begun in 1925 and was continued through 1934. A total of 95,474 infested trees were treated at a cost of $75,773 or approximately 79 cents per tree. All of these trees, except 1901 of miscellaneous species, were pines that were treated for control of the mountain pine beetle. Most of the treating was by the sun curing method. Felling and burning was employed to a limited extent to supplement the sun curing method. Repeatedly the beetle population

on control areas was reduced by 75 percent or more. Just as repeatedly infiltration from vast untreated areas north of the lake made it necessary to carry on the program year after year. This process continued until the susceptible host trees on the untreated areas were killed. Then the outbreak on the protected areas was readily controlled.

During the control period the policy was to protect the more valuable stands until the infestation on outlying areas had run its course. This approach was necessary because the vast acreage of infested timber, both in the park and on adjoining lands, made a complete cleanup impractical. In the years following cessation of large-scale control operations no particular control policy, other than the general one outlined in the Manual of the Branch of Forestry, was needed.

In March 1940 Jack Dodd and F. P. Keen, recognizing the potential need for adopting the general policy to local conditions, discussed a specific insect control program for the park. That program, although not formally adopted, calls for a three point policy that is still applicable. It involves three degrees of protection on an area basis, as follows:

1. All beetle-infested pines within a half mile of main roads and other intensively used areas should be treated whenever any develop.

2. The pine stands in the southern part of the park, from Castle Creek to Mount Scott, that were protected by the control work from 1925 to 1934, should be watched for any sign of a developing epidemic, such as the occurrence of three or more trees in a group. In these stands steps should be promptly taken to suppress incipient outbreaks.

3. The pine stands of the northern part of the park, from Castle Creek to Mount Scott, that have been decimated by the mountain pine beetle, should be excluded from control, for they no longer contain an appreciable percentage of susceptible trees.

Current Pine Beetle Situation

The upward trend of pine beetle infestation is of very recent origin. In September of 1944, F. P. Keen made a general reconnaissance and reported the park to be free of epidemic infestation. Referring to lodgepole pine, white pine, and white bark pine stands, he stated, "In recent years practically no loss from beetles has occurred. A few small groups of lodgepole appeared to have been killed in 1942 in upper Sand Creek above Lost Creek Station, but elsehwere in the park only an occasional "red-top" was noted...." This substantiated the park ranger reports that pine beetle infestation had been quiescent many years.

With one exception, the pine beetle situation in the park remains apparently unchanged since 1944. Pinnacles Valley, the exception, now harbors an active infestation with definite outbreak tendencies.

An estimated 300 "red-tops" (trees killed in 1945) are present on a comparatively limited area. The bulk of these, about 250 trees, are on the low divide between Sand and Wheeler Creeks, principally in Section 20. These trees occur in groups up to 30 or more, and the groups tend to merge into a rather well defined center. Approximately 25 scattered trees occur on the west side of upper Sand Creek, north of the checking station. Another 25 even more widely scattered trees are on the east side of Sand Creek.

At the time of the recent examination the attacks for 1946 were still in progress. On the basis of past experience they should continue until late September or early October. Under the circumstances no accurate count could be made of all the trees that will be attacked this year; however, upward of two miles of sample strip were run to obtain information on the character of infestation. On this small sample thirty-one trees occurring in groups of 1, 3, 11, and 16 trees were found to have been attacked in 1946. In nearly all cases the attacks were heavy and successful. Quite obviously the attacked trees could be expected to further the outbreak by producing good broods. Thus the indications were that there will be fully as many trees attacked in 1946 as there were in 1945.

Particular attention was given to determining the degree of isolation of the outbreak. From all that could be seen, the nearest outlying center consists of approximately 20 "red-tops" located about on the section line between Sections 13 and 24, T3lS, R7½E. This group is three miles east of the park and is over four miles from the center in Pinnacles Valley. A considerably larger group, though more distant, lies just northeast of the point where Sand Creek crosses the Dalles-California highway. Otherwise the surrounding lodgepole is remarkably free of infestation.

Discussion of Pine Beetle Control

Under present conditions the prospects for suppression of the outbreak and prevention of spread to other areas are good, for the outbreak is still small and is well isolated. No doubt the per tree costs will be high because of the prevalently high costs of labor and because the overhead costs must be charged against a relatively small number of trees. High per tree costs, however, should be more than counter-balanced by the economy of controlling the outbreak before it reaches large proportions.

The question of timing has been discussed. One proposal is that a project be undertaken this fall in order to make most effective use of an insect suppression crew to be organized for control work in the parks of Region 4. Such a control project could be carried on successfully during September and October. Because of late attacks and the unfaded condition of the trees, more trees probably would be missed than in the spring, and some cleanup might be necessary. In the past control has been done almost exclusively in the spring.

Three possible control measures apply to the problem at hand.

1. Felling and burning. This method has been used to some extent at Crater Lake National Park to supplement the sun curing method on north slopes and in dense stands where lethal temperatures could not be obtained by solar radiation. For the treatment of scattered individual trees and small groups it may again be useful as a supplementary measure. The accompanying fire hazard and the likelihood of scorching green trees make the general application of this method unsatisfactory under the conditions existing in the park.

2. Sun Curing. This method has been widely and successfully used in the park. The average cost of 79 cents per tree was remarkably low and the per man day output of treated trees was correspondingly high. There is no need to discuss the detailed application of this method for it is fully covered in Frank Solinsky's undated report entitled "The Method of Treating the Mountain Pine Beetle in the Lodgepole and Western White Pines in Crater Lake National Park."

The sun curing method is undoubtedly the cheapest that will give reliable results in the park. No fire hazard is involved and a minimum of equipment and materials is required. Close supervision of the treating work is necessary and the brood mortality must be carefully checked before the felled trees are turned. In some seasons the final turning must be delayed until very near the time for beetle emergence. Since the exact time for turning cannot be accurately forecast, it may be necessary to hold up the turning crew for several weeks after the trees have been felled. In some situations where the sun's rays do not produce killing temperatures the sun curing method must be supplemented by other measures. In general conditions in Pinnacles Valley are optimum for sun curing.

3. Oil treating. The use of penetrating oil is particularly suited for, and has been widely used in control of the mountain pine beetle in lodgepole pine. It can be used in the fall or spring. No fire hazard is involved nor is it necessary to revisit the treated trees, except for the routine purpose of checking the quality of the treating work. It does require close supervision and careful treating work. Special equipment and materials are necessary. Costs are considerably higher than in the sun curing method, but need not be excessively so. Perhaps its most important disadvantage is the fact that the insecticide must be obtained considerably in advance of operations and cannot be readily augmented to allow for any unexpected increase of infestation.

Treatment with penetrating oil is at the rate of about two gallons of mixed insecticide per tree. The mixture is as follows:

1 part orthodichlorobenzene
6 parts fuel oil

Control Costs. On a small project of this character it is practically impossible to estimate costs on a per tree or man-day output basis. On a job basis it is estimated that a 10 or 12-man crew could do a thorough job of spotting and treating in three weeks to one month. So far as time is concerned, it would make little difference on this particular project whether the sun curing or the oil treating method were used.

Other Insect Conditions

No insects, other than the mountain pine beetle, are causing any appreciable damage in the park. At the south entrance a normal infestation of the western pine beetle consisting of six trees attacked in 1945 and three trees attacked in 1946 was noted.

The sawfly (Neodiprion) outbreak on lodgepole pine on Klamath Indian Reservation has subsided without having done any damage within the park.

Scattered losses of a normal character are continuing in the stands of mountain hemlock and Shasta red fir.

Submitted by:

R. L. Furniss

R. L. Furniss
Entomologist

BUREAU OF
Entomology and Plant Quarantine
RECEIVED
☆ AUG 30 1946 ☆
Forest Insect Laboratory,
BERKELEY, CALIF.

FILE No. 462 + 642
Refer to: Noted by:

JEH
JMM
JCC
Ken

Forest Insect Laboratory
445 U. S. Court House
Portland 5, Oregon
August 28, 1946

Superintendent
Crater Lake National Park
Medford, Oregon

Dear Sir:

Enclosed is a report on the forest insect situation in Crater Lake National Park. Two copies are also being sent to the Regional Forester in San Francisco.

Insect-caused losses in the park as a whole are at a very low level, as they have been for many years. In Pinnacles Valley, however, there is a local buildup of mountain pine beetle in lodgepole pine. While this center is small, not exceeding 300 trees attacked by the 1945-46 generation, the trend seems to be upward. Under the circumstances it is desirable to undertake control to suppress this potential outbreak while it can be done at moderate cost.

The situation has been discussed with Chief Forester J. D. Coffman, Regional Forester Burnett Sanford, and Chief Ranger C. J. Crouch. While no decision was made as to the method to be employed, the possibility of importing an experienced crew this fall and treating the infested trees with penetrating oil was considered. In this connection you will note that the advantages and disadvantages of the penetrating oil and sun curing methods are given in the report. Both methods give good control.

In case penetrating oil is used, I suggest that application be on the basis of six parts of fuel oil to one part of orthodichlorobenzene. On the average two gallons of the mixture are required to treat one tree. On this basis two 55-gallon drums of orthodichlorobenzene will provide for the treatment of 335 trees and thereby will give some leeway in case there should be a seasonal increase in the number of infested trees.

A recent quotation on orthodichlorobenzene from Van Waters and Rogers Inc., 2133 NW York Street in Portland, is $9.50 per cwt. at Midland, Michigan, or San Francisco, California. The 55-gallon drums contain 550 pounds of the liquid; hence, the total cost for two drums, exclusive of terminal delivery charges, would be $104.50. Other concerns from whom bids might be asked are:

Dow Chemical Co., Midland, Mich.

cc FIC

Monsanto Chemical Wks., St Louis, Mo.
Mallinckrodt Chemical Wks., St Louis, Mo.
Solvay Sales Corp. 40 Rector St., N. Y. City
E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

We will be glad to give any technical advice or assistance that may be needed in planning or conducting control operations in the park.

Sincerely yours,

R. L. Furniss

R. L. Furniss
Entomologist

Enclosure

CRATER LAKE NATIONAL PARK - 642

TABLE OF CONTENTS

Keen, F.P. - Sept. 14, 1948 - Memo re: Crater Lake NP Control Work - Spring 1948

Patterson, J.E. - Jan. 31, 1948 - "Mountain Pine Beetle Control Project Crater Lake NP, Oregon Season of 1947."

Tomlinson, O.A. - Sept. 23, 1946 - Memo for Supt., Crater Lake.

Gilbert, C.E. - Dec. 2, 1944 - 1944 Annual Forest Insect Report.

Keen, F.P. - Sept. 13, 1944 - Memo of Forest Insect Inspection, Crater Lake NP.

Crater Lake NP. Project - Aug. 17,1932 - Use of Oil in Pine Beetle Control Proves Successful on Crater Lake NP Project.

Keen, F.P. - Dec. 1, 1930 - Report of Mountain Pine Beetle Situation in Crater Lake NP, Fall 1930.

Keen, F.P. - April 26, 1930 - The Mountain Pine Beetle Situation in Crater Lake NP Spring - 1930.

Keen, F.P. - Sept. 8, 1929 - Report of The Mountain Pine Beetle Infestation in the Lodgepole Stands of Crater Lake NP, Season of 1929.

Godfrey, Wm. C. - Season of 1929 - Summary of Work Done on Insect Control Projects in Crater Lake NP.

Patterson, J.E. - Spring 1929 - Entomological Report of the Insect Control Project, Crater Lake NP, Oregon.

Keen, F.P. - Season of 1929 - Report of the Mountain Pine Beetle Infestation in the Lodgepole Stands of Crater Lake NP.

Patterson, J.E. - April 1, 1929 - Forest Insects of Crater Lake Park.

Patterson, J.E. - Dec. 1928 - Mountain Pine Beetle Conditions, Crater Lake NP.

Patterson, J.E. - Jan. 14, 1927 - Report of the 1926 Control Work in the Crater Lake Park, Oregon

Patterson, J.E. - (no date) - Memo for Colonel C.C. Thomson, Supt. Crater Lake NP

Educ. Headquarters, NP Service - No date - Crater Lake Information Manual.